



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/639,587 | 08/13/2003 | Toshiaki Okuno | 50212-524 | 7692 |
| 20277 | 7590 | 09/07/2006 | EXAMINER | |
| MCDERMOTT WILL & EMERY LLP 600 13TH STREET, N.W. WASHINGTON, DC 20005-3096 | | | CURS, NATHAN M | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2613 | |

DATE MAILED: 09/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|--|--|
| Office Action Summary | Application No. 10/639,587 | Applicant(s) OKUNO, TOSHIAKI | |
| | Examiner Nathan Curs | Art Unit 2613 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 August 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-7, 10-14, 16-18, 21 and 22 is/are rejected.
- 7) ☒ Claim(s) 4, 8, 9, 15, 19 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>8/03, 12/03, 8/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 5, 12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou et al. ("Zhou") (US Patent Application Publication No. 2002/0021862), in view of Deng et al. ("Deng") (US Patent Application Publication No. 2002/0196491), and further in view of Essiambre et al. ("Essiambre") (US Patent Application Publication No. 2004/0208617), and further in view of Miller (US Patent No. 6044189).

Regarding claims 1 and 12, Zhou discloses an optical transmission system, comprising: an optical transmitter including a light source, said optical transmitter outputting signal light in a signal wavelength band and an optical receiver receiving the signal light outputted from said optical transmitter (fig. 1 and paragraph 0028); an optical fiber transmission line for transmitting the signal light outputted from said optical transmitter as a transmission medium provided between said optical transmitter and said optical receiver, said optical fiber transmission line having a positive chromatic dispersion at an operation wavelength of said direct modulation light source (fig. 1 and paragraphs 0034 and 0035); and at least one non-temperature controlled dispersion compensator provided on an optical path either between the signal outputting end of said optical transmitter and the signal entering end of said optical fiber transmission line (fig. 2c and paragraphs 0056 and 0057) or between the signal receiving end of said optical receiver and

Art Unit: 2613

the signal emitting end of said optical fiber transmission line (fig. 2a and paragraphs 0037-0040). Zhou discloses a WDM system but does not disclose that the optical transmitter light source is a non-temperature controlled direct modulation light source. Deng discloses that inexpensive, non-temperature controlled lasers in WDM systems can be used with sufficient wavelength spacing (abstract and paragraph 0016). It would have been obvious to one of ordinary skill in the art at the time of the invention to use non-temperature controlled lasers and sufficient wavelength spacing in the WDM, to avoid the additional cost associated with temperature controlled lasers, as taught by Deng. Zhou discloses that the dispersion after compensation is zero or a predetermined value of residual dispersion (paragraph 0040), but does not explicitly disclose that, at either the signal emitting end of said optical fiber transmission line or at the signal receiving end of said optical receiver, respectively, the accumulated chromatic dispersion at the operation wavelength is set to negative. Essiambre discloses that using small negative residual dispersion results in better transmission performance than zero or slightly positive residual dispersion (paragraphs 0030, 0039 and 0040). It would have been obvious to one of ordinary skill in the art at the time of the invention to use dispersion compensation that produces small negative residual dispersion for the system of Zhou, in order to achieve the best transmission performance, as taught by Essiambre. Zhou does not disclose that the system operates over a temperature range of 0.degree.C. to 60.degree.C; however, Miller discloses that normal operating temperature for optical fiber system is -40.degrees.C to 80.degrees.C (col. 1, lines 16-19 and col. 4, lines 47-51). It would have been obvious to one of ordinary skill in the art at the time of the invention to operate the system of Zhou within the range of 0.degrees.C to 60.degrees.C since this is one of numerous acceptable operating ranges for an optical fiber system based on the teaching of Miller..

Regarding claims 5 and 16, the combination of Zhou, Deng, Essiambre and Miller discloses an optical transmission system according to claims 1 and 12, wherein said optical fiber transmission line includes a single-mode optical fiber (Zhou: paragraph 0034), which inherent has a zero-dispersion wavelength of near 1.3 μm .

3. Claims 2, 3, 6, 7, 13, 14, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou et al. ("Zhou") (US Patent Application Publication No. 2002/0021862), in view of Deng et al. ("Deng") (US Patent Application Publication No. 2002/0196491), and further in view of Essiambre et al. ("Essiambre") (US Patent Application Publication No. 2004/0208617), and further in view of Miller (US Patent No. 6044189) as applied to claims 1, 5, 12 and 16 above, and further in view of Kartalopoulos ("Introduction to DWDM Technology"; IEEE Press; 2000; pages 50, 51 and 55).

Regarding claims 2 and 13, the combination of Zhou, Deng, Essiambre and Miller discloses an optical transmission system according to claims 1 and 12, further comprising a demultiplexer for demultiplexing a plurality of signal channels propagating through said optical fiber transmission line into one signal channel group in a first wavelength band and the other signal channel group in a second wavelength band (Zhou: fig. 2a), wherein said dispersion compensator compensates for the accumulated chromatic dispersion in the signal channel group of the second wavelength band (paragraphs 0037-0040), and wherein, at the signal outputting end of said dispersion compensator, the accumulated chromatic dispersion in one of the signal channels of the second wavelength band passing through said dispersion compensator is negative over the temperature range of 0.degree.C. to 60.degree.C (Essiambre: paragraphs 0030, 0039 and 0040, and Miller: col. 1, lines 16-19 and col. 4, lines 47-51, as applicable in the combination). The combination of Zhou, Deng, Essiambre and Miller

Art Unit: 2613

discloses WDM and EDFAs, but does not disclose that the first wavelength band includes a zero-dispersion wavelength of said optical fiber transmission line. However, Kartalopoulos discloses using dispersion-shifted fiber with a WDM system having a zero-dispersion point shifted at 1550 nm (pages 50 and 51, section 3.13). It would have been obvious to one of ordinary skill in the art at the time of the invention to use DSF with the WDM system of the combination, in order to provide the benefit of using fiber that is designed to be compatible with amplifiers that operating in the 1550 nm range for WDM, such as EDFAs.

Regarding claims 3 and 14, the combination of Zhou, Deng, Essiambre, Miller and Kartolopoulos discloses an optical transmission system according to claims 2 and 13, wherein, at the signal outputting end of said dispersion compensator, the accumulated chromatic dispersion in all the signal channels of the second wavelength band passing through said dispersion compensator is negative over the temperature range of 0.degree. C. to 60.degree. C (Essiambre: paragraphs 0030, 0039 and 0040, and Miller: col. 1, lines 16-19 and col. 4, lines 47-51, as applicable in the combination).

Regarding claims 6 and 17, the combination of Zhou, Deng, Essiambre and Miller discloses an optical transmission system according to claims 1 and 12, but does not disclose that said optical fiber transmission line, at a wavelength of 1.38 μm , has a transmission loss smaller than a transmission loss at a wavelength of 1.31 μm . Kartalopoulos discloses AllWave fiber, based on SMF with the OH radical removed, and where loss at 1380 nm is less than at 1310 nm (fig. 3.16 and page 55). It would have been obvious to one of ordinary skill in the art at the time of the invention to use AllWave fiber, to provide the benefit of more wavelengths available in the transmission spectrum, due to the removal of the OH radical impact on transmission loss.

Art Unit: 2613

Regarding claims 7 and 18, the combination of Zhou, Deng, Essiambre and Miller discloses an optical transmission system according to claims 1 and 12, but does not disclose that said optical fiber transmission line has a zero-dispersion wavelength which exists in a wavelength range of 1.35 μm to 1.5 μm . However, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Kartalopoulos with the combination as described above for claims 2 and 13.

4. Claims 10, 11, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou et al. ("Zhou") (US Patent Application Publication No. 2002/0021862), in view of Deng et al. ("Deng") (US Patent Application Publication No. 2002/0196491), and further in view of Essiambre et al. ("Essiambre") (US Patent Application Publication No. 2004/0208617), and further in view of Miller (US Patent No. 6044189) as applied to claims 1, 5, 12 and 16 above, and further in view of Gabitov (US Patent Application Publication No. 2002/0048070).

Regarding claims 10 and 21, the combination of Zhou, Deng, Essiambre and Miller discloses an optical transmission system according to claims 1 and 12, but does not disclose pumping light supply means for supplying Raman-amplification pumping light into said optical fiber transmission line, so as to Raman-amplifying the signal light propagating through said optical fiber transmission line. Gabitov discloses opening up the 1300 nm range for WDM transmission in a WDM system by using Raman amp with a pumping light center at 1240 nm (abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a Raman amp with a pump light centered at 1240 nm in the system of the combination, to provide the benefit of opening the 1300 nm transmission window for greater WDM transmission, as taught by Gabitov.

Art Unit: 2613

Regarding claims 11 and 22, the combination of Zhou, Deng, Essiambre, Miller and Gabitov discloses an optical transmission system according to claims 10 and 21, wherein said pumping light supply means supplies the Raman-amplification pumping light of a plurality of pumping channels included in a wavelength range of 1.2 μm to 1.3 μm into said optical fiber transmission line (Gabitov: abstract, as applicable in the combination).

Allowable Subject Matter

5. Claims 4, 8, 9, 15, 19 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

6. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (800) 786-9199.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

Art Unit: 2613

system, see <http://pairedirect.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



JASON CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600